



Wildlife ecologist Joshua Millspaugh uses radio tracking to determine rabbit habitat selection in various cover types and to better understand their movements in relation to tree damage.

Agroforestry and Wildlife Management Go Together on Small Farms

When one thinks of rural America, images of farms, trees, and wildlife probably come to mind. All three components are tightly linked in a cooperative research program to reforest Missouri floodplains once dominated by oaks and other native trees.

The Agricultural Research Service's Dale Bumpers Small Farm Research Center is working with the University of Missouri (UM) Center for Agroforestry in the Agroforestry Family Farm and Floodplain Program. ARS's David K. Brauer, research leader, and agronomist David M. Burner provide support and serve as advisors to the program, which is partially funded by ARS.

One priority of the ARS center, located in Booneville, Arkansas, is to develop efficient agricultural systems for agroforestry—the simultaneous production of animal forage, crops, and lumber on the same land. ARS wants to transfer the knowledge they gain to landowners and conservationists.

“We conduct research on the biological efficiency, economic potential, and environmental benefits of both pine- and hardwood-based agroforestry practices,” including those that minimize the impact of flooding, Brauer says. “This information will help promote agroforestry as a land-use practice in the United States.”

The university's center has brought together different departments in its College of Agriculture, Food, and Natural Resources and various government agencies to demonstrate agroforestry's ability to generate income, improve the environment, lessen the impacts of periodic flooding, and create and improve wildlife habitat.

One project nearing completion is examining the role of different types, sizes, and locations of agroforestry and native

bottomland forest patches in maintaining wildlife communities in an area along the Mississippi River in southeastern Missouri. Mickey Heitmeyer and Leigh Fredrickson, wetland biologists with UM's Fisheries and Wildlife Department, are looking at six wildlife communities—anurans (frogs and toads), songbirds, birds-of-prey, bats, swamp rabbits, and waterbirds—and determining, among other things, where and how to plant different crops and trees to best benefit them. Certain government subsidy programs, including the Farm Security and Rural Investment

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Agronomist David Brauer (left) and forester Dan Dey examine a cover crop of redbud grass, which suppresses weed competition and provides little winter cover for rabbits.

Act of 2002 (the Farm Bill), encourage creation of high-quality wildlife habitats.

Another study looked at privately owned plots with typical agricultural uses for that region, including agroforestry. If conservationists want to protect the yellow warbler songbird, for example, the researchers found it is best for farmers to provide the birds with habitat in abandoned channels on the river side of mainstream levees along the Mississippi River.

Researchers used the plots to determine how songbirds select breeding territories and react to different agroforestry systems. They found that certain songbirds were common in agroforestry areas, and they seemed to have a preference for young forests. If, however, bats are to be protected, conservationists should be interested in those areas inside levees where trees that provide greater forest cover are grown.

“Certain areas of the floodplain where crops were once grown are better suited for forest patches, because trees, including agroforestry plantings, can provide a riparian forest buffer along the river,” Heitmeyer says. “Not only is this practice good for the environment, it’s also good for wildlife conservation efforts. We want to rate which practices, for instance, help reduce soil erosion and help improve water quality and wildlife habitat.”

The Mighty (Tasty) Oak

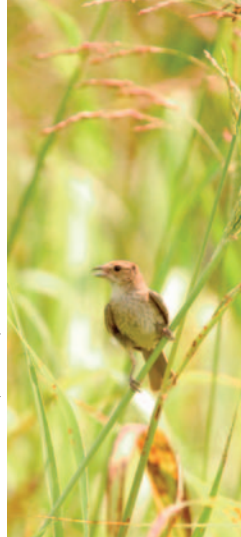
Bottomland restoration research at Smoky Waters and Plowboy Bend conservation areas in Missouri is using the root production method (RPM) system for growing trees. Pioneered by a Missouri nurseryman, the system promotes a tree’s root system by using bottomless pots, creating a dense mass of roots that enables the tree to absorb more oxygen, water, and nutrients and establish quickly after being transplanted. Floods in 1993 and 1995 took their toll on oaks in 100-year floodplains along the Missouri and Mississippi rivers. The enhanced root system increases survival rates, significantly accelerates growth, and generates early flowering and fruiting. Booneville scientists have had great success establishing hardwood trees in Arkansas and Tennessee using seedlings produced by the RPM system.

Acorns are an important element in the diets of area wildlife. The RPM technique helped trees generate acorns after just 3 to 4 years instead of 20 to 25, providing wetland wildlife with necessary food. And, because they survive better under water than bare-root seedlings, these RPM-grown trees flourish even during periodic flooding.

Additional work at the UM center considered why rabbits preferred to eat oak seedlings that are surrounded by specific vegetation. Josh Millspaugh, a UM wildlife biologist, and Dan Dey from USDA’s Forest Service, wanted to see how eastern cottontail rabbits forage in bottomland fields so they could develop techniques that would decrease damage to plantings. Because there is less vegetation available in the winter, oak seedlings are hard for the rabbits to resist.

Cover crops such as redtop grass keep competing natural vegetation in check and allow oak saplings to flourish. At a

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An Indigo Bunting (male) is just one of the songbirds common in agroforestry areas.

conservation area in Missouri, one block was planted with oak trees and a redtop grass cover crop. Another block was planted with oaks and no cover crop. And a third control block contained natural vegetation that was unmanipulated. The researchers determined that natural vegetation is taller in some areas in the winter, keeping the rabbits safe from predators.

“But redtop grass suppresses that natural vegetation and mats down flat in the winter, providing little cover for rabbits while they eat,” Millspaugh says.

The researchers will test other methods they’ve devised to protect seedlings from being eaten by rabbits, such as mowing near plantings to reduce cover. Further, they are monitoring rabbit behavior with radio transmitters attached to collars. Other techniques include applying plastic wraps around oak plantings and providing alternate food sources to tempt rabbits away from the young trees.—By **Jim Core, ARS.**

This research is part of Integrated Farming Systems, an ARS National Program (#207) described on the World Wide Web at www.nps.ars.usda.gov.

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In Big Oak Tree State Park, Missouri, research assistant Shane Pruett (left) records vegetation and plant cover around an Indigo Bunting nest. Technicians Jon Mcallister and Tara Eisenhower use a modified microsecurity camera to spy on nest activity.